



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER OF PATENTS AND TRADEMARKS  
Washington, D.C. 20231  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/762,508	02/07/2001	Joachim Baumann	P01,0008	4624

30596 7590 03/10/2003

HARNESS, DICKEY & PIERCE, P.L.C.  
P.O.BOX 8910  
RESTON, VA 20195

EXAMINER

GAGLIARDI, ALBERT J

ART UNIT PAPER NUMBER

2878

DATE MAILED: 03/10/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/762,508

Applicant(s)

BAUMANN ET AL.

Examiner

Albert J. Gagliardi

Art Unit

2878

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 06 January 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Comment on Submissions*

1. The response filed 6 January 2003 has been entered as Amendment B.

### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).
4. Claims 1-3, 5, and 7-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Egee *et al.* (US 4,875,175) in view of Geiler *et al.* (US 5,206,710).

Regarding claim 1, Egee discloses **Figs. 1, 6** a thermal wave measuring method for contact-free measurement of geometrical or thermal features of a layer structure comprising the steps of: simultaneously (col. 8, lines 21-25) modulating a flux of thermal energy from a modulatable heat source (30) with at least two predetermined discrete and differently modulated frequencies, thereby periodically heating the layer structure (1) (col. 2, lines 12-18 and lines 25-

Art Unit: 2878

29); receiving infrared radiation (34) emitted by the layer structure (1) that is correspondingly modulated in intensity (col. 2, lines 19-24 and lines 30-34); and evaluating (36) the received infrared radiation as a function of a drive frequency on the basis of amplitude or phase by simultaneously interpreting corresponding drive frequencies (col. 2, lines 35-48).

*Egee* does not specifically disclose that simultaneous modulating of the flux of thermal energy from the heat source is performed by driving the heat source with two predetermined discrete and differently modulated frequencies.

Regarding simultaneously driving the heat source with two discrete and differently modulated frequencies, *Geiler* discloses **Figs. 1-4** a thermal wave measuring method utilizing a variety of functionally equivalent means for periodically heating a layer structure wherein the periodic heating may be performed either by simultaneously driving the heat source with two predetermined discrete and differently modulated frequencies (see generally Fig. 1) or modulating a flux of thermal energy from the heat source with two predetermined discrete frequencies (see generally Figs. 2 or 3).

Absent some degree of criticality, the choice of either method would have been a matter of routine design choice within the skill of a person of ordinary skill in the art depending on the needs of the particular application in view of the known use of such methods for the functionally purpose of periodically heating a layer structure.

Regarding claim 2, *Egee* discloses that the heat source (30) is a laser.

Regarding claim 3, *Egee* discloses a sep of adapting the discrete frequency parts to a measurement function (col. 5, lines 19-37).

Regarding claim 5, *Egee* discloses that the evaluation may proceed by a computing means using computer programs to determine the desired parameters. Those skilled in the art appreciate that computer programs utilizing fast Fourier transforms for data evaluation are well known. Therefore, absent some degree of criticality, the use of a program utilizing a fast Fourier transform to evaluate data would have been an obvious, if not inherent, design choice depending on the needs of the particular application.

Regarding claim 7, *Egee* discloses that the method may comprise a step of calibrating the method to a specific layer structure utilizing mathematically specific, theoretical values as well as utilizing experimentally supported data (col. 5, lines 8-12; col. 6, lines 52-56; and col. 9, lines 6-15).

Regarding claim 8, *Egee* discloses a step of determining geometrical features (i.e., thickness) given known thermal features (col. 6, lines 32-40).

Regarding claim 9, *Egee* discloses that the evaluation may proceed by a computing means using computer programs to determine the desired parameters. Those skilled in the art appreciate that computer programs utilizing a variety of mathematical/analytical techniques including fast Fourier transforms, regression analysis, and/or neural networks to evaluate data are well known. Therefore, absent some degree of criticality, the use of a program utilizing a fast Fourier transform and a regression analysis or neural network to evaluate data would have been an obvious, if not inherent, design choice depending on the needs of the particular application.

Regarding claim 10, *Egee* discloses a step of determining thermal features (i.e., absorptivity, thermal resistance) given known geometrical features (col. 4, lines 52-67).

Art Unit: 2878

5. Claims 4 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Egee* and *Geiler* as applied to claim 1 above, and further in view of *Rosencwaig* (US 4,513,384).

Regarding claim 4, regarding detecting the predetermined frequencies with a lock-in evaluation, it is noted that *Egee* generally discloses that the evaluation of the predetermined frequencies utilizes a synchronous detector (35) controlled by the modulator (31) (col. 9, lines 53-64). Regarding the specific use of a lock-in evaluation, it is noted that *Rosencwaig* discloses **Fig. 4** a thermal wave measurement system wherein the evaluation of the predetermined frequency uses a synchronous means comprising a lock-in amplifier tuned to the modulation frequency of the heating beam. Those skilled in the art realize that lock-in amplifiers are well known and readily available. Therefore, it would have been an obvious design choice within the skill of a person of ordinary skill in the art to modify the method disclosed by *Egee* such that evaluation of the predetermined frequency utilizes a lock-in evaluation, as suggested by *Rosencwaig*, in view of the known use of such lock-in evaluation means and the ready availability thereof.

Regarding claim 6, in the method suggested by *Egee* and *Geiler* and modified in view *Rosencwaig* (see explanation regarding claim 4 above) *Rosencwaig* further suggests the use of an additional evaluation utilizing a regression (least squares) analysis (col. 4, lines 24-27).

#### ***Response to Arguments***

6. Applicant's arguments filed 6 January 2003 have been fully considered but they are not persuasive.

7. Regarding applicant's argument that *Egee* makes only a fleeting reference to the use of simultaneous modulation and does not provide further details on how the modulation takes place

Art Unit: 2878

(apparently suggesting that the prior art is inoperative), the examiner notes regardless of whether or not *Egee* disclosed the particular details of simultaneous modulation, simultaneous modulation and demodulation of electromagnetic signals is well known and involves only that level of skill as would have been possessed by one of ordinary skill in the art. Additionally, any gaps in the disclosure of *Egee* are filled by *Geiler*, which clearly teaches as least two methods for simultaneously exciting a sample with energy modulated at two different frequencies. See MPEP 2121.01 for discussions relating to rejections where operability is in question.

Regarding applicant's argument that *Egee* is completely silent regarding receiving infrared energy, the examiner notes that the detector (ref. 34 shown in figure 6) is described as an infrared detector cell (col. 9, line 60).

8. Regarding applicant's argument that *Geiler* only shows a laser source that receives frequencies  $f_1$  and  $f_2$  and does not teach or suggest "simultaneously driving a modulatable heat source with at least two predetermined and differently modulated frequencies, the examiner calls applicant's attention to col. 5, lines 1-11 which clearly describe simultaneous modulation of a heat source (laser diode) with two discrete and differently modulated frequencies ( $f_1$  and  $f_2$ ) thereby periodically heating (effective excitation) the object. Such description clearly solves any deficiencies of *Egee*.

The examiner further notes that one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). In this case, *Geiler*, as applied to claim one, is cited only for the teaching of

Art Unit: 2878

simultaneously driving a modulated heat source with two different frequencies, which is clearly disclosed.

9. All of applicant's argument having been addressed, the rejection is maintained.

***Conclusion***

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Albert J. Gagliardi whose telephone number is (703) 305-0417. The examiner can normally be reached on Monday thru Friday from 9 AM to 5 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David P. Porta can be reached on (703) 308-4852. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.



Art Unit: 2878

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.



Albert J. Gagliardi  
Examiner  
Art Unit 2878

AJG  
March 6, 2003